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Effect of dissolved oxygen on the synthesis of copper oxide nanoparticles by atmospheric pressure plasma electrolysis J. LIU, N. SHARAI, K. SASAKI, Hokkaido University — Plasma-liquid interactions have drawn much attention due to its unique ability of producing highly reactive species which make it possible for a wide range of materials synthesis. Here, we present a simple one-step route to synthesize copper oxide (CuO or Cu_2O) nanoparticles by using atmospheric pressure plasma electrolysis system. In this system, a helium plasma was generated via a stainless steel tube which acted as a cathode. The plasma was contacted with the NaCl-containing solution and a copper plate was partially immersed into the solution as the counter electrode. In the work, we investigated the effect of chloridion (Cl^-) by tuning the concentration of NaCl and also compared the experiments by using solution with different concentration of dissolved oxygen (DO). The results showed that the dissolved oxygen played a key role to determine which kind of copper oxide was formed. In the case of high concentration of DO, cupric oxide (CuO) was synthesized while cuprous oxide (Cu_2O) was obtained in the case of low concentration of DO. The synthesis processes and mechanism leading to the nanoparticles are also been demonstrated.

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